# IN HEAVEN'S NAME, BE AN ENGINEER

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*(Some things that were said—and some that were intended to be said—in an address to Tau Beta Pi, March 5, 1938.)*

ELBERT HUBBARD wrote a maxim that begins "When you work for a man, in Heaven's name, work for him." (I don't know whether the emphasis is on WORK or on HIM; perhaps it's on both. At any rate, Mr. Hubbard's saying is to the effect that you should give your employer your best in service and loyalty, and if you can't do that you should quit.) My theme is parallel. It's an exhortation to prepare yourself to be the engineer that presumably is in your make-up, and not to try to combine in yourself all the attributes that you've heard are necessary to success and that are supposed to make people in other professions, notably law and medicine, count for a great deal in the world as it's organized today.

In other words, if you're an engineer, be yourself. Don't run the risk of losing what distinction and special usefulness is yours in a frantic desire to be someone else.

You'd hardly suppose a suggestion like that would seem in order, for anyone who has gone along to the junior or senior year in engineering, and done well in it, would be concentrating on engineering and not something else. Strangely enough, though, the engineering way of doing things is under fire—and a lot of the shooting has been done by the engineers themselves. I don't know who started it, but this attack has been going on for quite a number of years, and the engineers have suffered from it. Recently, it appears, the fighting has let up somewhat, but it's still pretty lively in places.

An engineer's way of going about things is direct, and often it seems too simple to represent all the patient observation and hard thinking that have gone into it. You might call it a formula, and write it:

Information + cogitation + imagination + planning + action = satisfactory results.

Of course, the terms vary in quantity, but they should all be there. The trouble with much that passes for "planning" is that some of the other terms are missing.

You'd not think there'd be any disagreement about the formula. It makes some complicated things seem simple after they're done, like Bessemer's blowing air through iron to make steel for instance. There seems to be no reason for complications if you can avoid them, unless, as someone remarked, "It's more fun to think up hard ways of doing things."

One trouble with this simplicity is that it's frank. It has no room for magic, and after people have seen what seems to them to be miracles, like radio and airplanes—and those are miracles that we take for granted—they are disappointed to find that there are some things the engineers can't do. People have changed from skeptics to believers in the impossible. Once they were like the old fellow you know, who looked at the giraffe and insisted "There ain't no such animal." Quite different now. The giraffe is neglected in the demand that a non-existent and incredible animal be produced.

You can't convince them not to expect too much. I once heard a barber assert vehemently that all the power we need could come from within the atom, if only the wicked financiers would let us have it. Nothing would change his belief.

In cases like that the engineers need to be patient and do the best they can to educate their fellow citizens. But they must resign themselves to some unpopularity because they cannot always make the glowing reports that people want to hear. There's always that difficulty. A. E. Housman said it beautifully (a good quotation insures that at least part of a speech will be good) in this stanza:

> To think that two and two are four
> Instead of five or three
> The heart of man has long been sore
> And long 'tis like to be.

And Chairman Arthur Morgan of the T.V.A. Commission tells us of its importance in ANTIOCH NOTES:

> They are simple minded people who think that because there are present in our society most of the raw materials for unlimited plenty and for a good social order, we need nothing more than laws or revolutions to create that order. Impeding barriers to development should be removed; yet high expectation from revolution generally will bring disillusionment, as in Russia and Germany.
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> Those who promise social miracles are wasters of public resources. To arouse a high pitch of ecstasy by promising universal plenty through some sudden change of social and political organization is a waste of resources, because the capacity for giving time and effort to solid development is destroyed by surges of emotion. When the appetite for Utopia is greatly developed, reality fails to satisfy. As one promise fades people rush to another.
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> When promises have been made often enough and alluringly enough, any person who draws attention to the hard work and self-discipline necessary for real achievement comes to be looked upon as a traitor to the social welfare —as one who steals away the people's hope. Those leaders who develop in a people a craving for social and economic miracles do a great disservice. They infect society with a disease which it is very difficult to cure.

You see, the engineering way of doing things is different from the approach of some other professional men, especially politicians, and is bound to suffer from the engineer's difficulty of not always saying what

people want to hear. It has limitations. Within those limitations engineers can work effectively. They should not try to escape their limitations by tricks of any kind.

With these limitations—which aren't particularly cramping if you once accept them—the engineers have done pretty well. For some strange reason, though, the idea got out that engineers fall far short in a good many ways, and that idea has caused much discussion and feverish anxiety.

It's been going on for a long time, this talk about the engineer's failure as a citizen and man of culture. The engineers themselves have put on the shoe so enthusiastically that they have run the risk of being rated, by themselves and others, as amounting to far less than they really do.

For a time the suffering of engineers at their so-called narrowness was sharp indeed; they went feverishly about improving themselves. They subjected themselves to "Broaden Out" lectures that scoffers couldn't resist dubbing "Flatten Out Engineers." In articles in technical magazines and in letters to the editors and at all sorts of meetings they scolded themselves for their shortcomings. Even in chance conversations, when two of them would meet in a Pullman smoking room, there was gloom about the narrowness of engineering education. The young fellows just getting into the profession were supposed to be in a particularly bad way. They were dry as dust, they couldn't talk, and worst of all, they didn't know how bad they were. People in other kinds of work sympathized and were glad they weren't engineers.

A few observant people tried to cheer the engineers, but making headway was uphill business. As far back as 1925 the *Engineering News-Record* made an editorial pass at the gloom:

AGE AND YOUTH

(Engineering News-Record, October 29, 1925)

Recently the editor of the Engineering News-Record had occasion to attend two meetings. At one, a number of practicing engineers, all at least twenty years out of college, asserted that engineering education is becoming mechanized, that the recent graduates are too technical and absorbed too greatly in the details of engineering minutiae, that they all stand in need of wider outlook and background. The other meeting was a group of the editors and business managers of a score of the magazines published by the undergraduates of engineering schools. (Engineering College Magazines Associated). Throughout a busy day's session these young men discussed the problems of their avocations. And from a long experience in attending technical meetings, this editor can say that never has he heard more direct, confident, precise, and clear speech than these same undergraduates used. What each had to say he said explicitly and stopped; repetition was rare, hesitation was non-existent. Can as much be said of the average engineering meeting? Emphatically no! And since the ability to think clearly and to express that thought succinctly is one of the best outward evidences of those qualities the engineers in the mature meeting found lacking in their younger brethren, the thought became inescapable that these gentlemen—who, indeed, were voicing a common enough thought among engineers—are attacking a straw man.

A dozen years since that editorial was printed have made a difference. True, essays are still written urging the engineer to step out of his technical shell, and the opinion that engineers lack human qualities and breadth of interest persists in places, but engineers seem less concerned than formerly about wanting to be like someone else. They are far from complacent —I hope they'll never get that way. But they are not so fearful that their engineering characteristics are a sort of handicap to them in doing engineering work.

Engineering education interests the engineers. That was evident at the 1938 Ohio Society of Professional Engineers meeting in the turn out and discussions of the section on education presided over by Professor Harry Nold.

Professor E. E. Dreese showed that the trend had set in the other way, for in his paper he said we ought to realize that culture isn't a matter of taking some course or other, but is something that is tied up with a man's whole life and environment. He couldn't see that the doctors and lawyers have done a particularly good job of saving the world, so why should the engineers want to be just like them? And Mr. M. N. Boring of the General Electric Company, a man who has interviewed thousands of engineers, admitted that his point of view had changed. He used to be awfully concerned about the so-called intangibles of personality and "broadening" courses like public speaking and accounting and salesmanship, but now he and his company want to be sure, first, that the young engineers they hire know their engineering. Other attributes count, of course, but technical ability and knowledge are basic.

Along with our engineering we should get as much breadth and depth of other interests as we can, without any of the fever that "we must be cultured or die." Making breadth a career is futile. Your aims will be scattered among a mixture of things that are always changing, like bridge, for instance, in which you may be proficient, but in danger of becoming a back number because someone has had the idea of putting a green suit into the deck. (Bridge is about as unstable as anything I can think of. You know Grandpa Garrity said "I'm goin' to learn to play bridge whist if they ever get that durn game settled.")

No, if you have the engineering make-up, be an engineer. Matthew Arnold tells in his poem "Self Dependence" how he begged for reassurance from Nature, and received this answer:

"Wouldst thou be as these are? Live as they.

"And with joy, the stars perform their shining,
And the sea its long moon-silvered roll,
For self-poised they live, nor pine with noting,
All the fever of some diff'ring soul.

"Bounded by themselves, and unreregardful
In what state God's other works may be,
In their own tasks all their powers pouring
These attain the mighty life you see.

"Resolve to be thyself, and know that he,
Who finds himself loses his misery."